

REMARKS

Claims 1-17 and 22-24 are all the claims pending in this application. Claims 18-21 have been canceled and claims 6 and 17 have been amended to depend from claim 1.

Entry of the above amendments is respectfully requested.

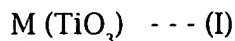
I. Response to rejection of Claims 1, 6, 14 and 17-24 under 35 U.S.C. § 103(a)

On page 2 of the Office Action, claims 1, 6, 14 and 17-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sanchez '487 or Harley '072 or Menashi '939 or Bruno '674.

Basically, the Examiner cites Sanchez, Harley, Menashi and Bruno as teaching or at least suggesting the present invention. See example 1 of Sanchez; example 1 of Harley; Table IX, cols. 19-20 of Menashi; cols. 2, 14 of Bruno. In addition, the Examiner asserts that any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made.

Applicants respond as follows.

The present invention relates to a perovskite titanium-containing composite oxide particle having a composition represented by general formula (I), wherein the specific surface area is 28 to about 200 m²/g, the specific surface area diameter D₁ of primary particles defined by formula (II) is about 10 to 50 nm, and a D₂/D₁ ratio of the average particle size D₂ of secondary particles to D₁ is about 1 to about 10:



wherein M is at least one of Ca, Sr, Ba, Pb, or Mg,

$$D_1 = 6 / \rho S \text{ --- (II)}$$

ρ is the density of the particles, and S is the specific surface area of the particles. Since the value D_2/D_1 is about 1 to about 10, the primary particles possess excellent dispersion properties. Accordingly, the particles of the present invention show sufficient transparency when formed into a thin film, and the particles can be applied to a photocatalyst. *See e.g.*, page 7, lines 5-10 of the present specification. In addition, the excellent dispersion properties of the present particles can be seen from Table 1 of the present specification. Accordingly, the particular relationship between D_2 and D_1 provides a particularly excellent effect.

1. Bruno

Bruno discloses particles having a surface areas of 0.1 to 10.8 m²/g. *See* Table 1. Based on the surface areas, the primary particle sizes are 9 to 11 μ m. Accordingly, the surface areas and the primary particle sizes are outside the range of the surface areas (28-200 m²/g) and primary particle sizes (10-50 nm) of the present invention.

Therefore, it is respectfully submitted that Bruno fails to disclose the oxide particles of the present invention.

2. Sanchez

Sanchez relates to a method of preparing fine-sized powders, such as BaTiO₃, having a final surface area of 12 m²/g. *See* Example 1. However, Sanchez does not disclose secondary particles, and therefore, does not disclose the D_2/D_1 ratio of the present invention.

Accordingly, Sanchez fails to teach or suggest the particles of the present invention.

3. Harley

Harley relates to a process for preparing a ceramic green body by hydrolyzing at least one alkoxide selected from 2 specified groups. Harley discloses BaTiO_3 particles having a surface area of about $91 \text{ m}^2/\text{g}$. Harley does not disclose secondary particles and therefore, does not disclose a D_2/D_1 ratio within the range of the present invention. In particular, Harley teaches against agglomeration. *See e.g.*, col. 4, lines 22-24 and 31-32, and col. 5, lines 44-48.

Therefore, Harley does not teach or suggest the particles of the present invention.

4. Menashi

Menashi relates to a process for producing barium titanate based powder products consisting of unaggregated, primary particles. *See* col. 6, lines 22-26. Menashi discloses particles with surface areas of 5.7 to $16.4 \text{ m}^2/\text{g}$. *See* Table II. These surface areas mean that the primary particle sizes are 6-18 μm . Accordingly, the surface areas and primary particle sizes of the particles of Menashi are outside the claimed range of surface areas ($28\text{-}200 \text{ m}^2/\text{g}$) and primary particle size (10-50 nm).

Therefore, Menashi does not teach or suggest the particles of the present invention.

In view of the above, it is respectfully submitted that Bruno, Sanchez, Harley and Menashi fail to teach or suggest the particles of the present invention. Accordingly, withdrawal of the foregoing rejection is respectfully requested.

II. Response to rejection of Claims 6, 17, 23 and 24 under 35 U.S.C. § 103(a)

On page 3 of the Office Action, claims 6, 17, 23 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '607.

Basically, the Examiner's position is substantially the same as that set forth in the previous Office Action. The Examiner cites JP '607 as teaching or at least suggesting the present invention. *See* paragraph 38. The Examiner asserts that any difference imparted by process limitations would have been obvious. In addition, the Examiner asserts that Applicants have not shown that the particles of JP '607 are different from those of the present invention.

Applicants respectfully respond as follows.

It is respectfully submitted that the surface area of the particles of JP '607 is outside the claimed range. That is, the surface area of [0038] should be about 400 m²/g based on the XRD, which supports a particle size of 3 nm converted from the specific surface area.

Also, since the primary particle size is 3 nm (0.003μm) and the size of the secondary particle is 0.1 to 0.3 μm, the ratio of D₂/D₁ is not within the range of 1 to 10 of the present invention.

Therefore, based on the above, the particles of the present invention are not taught or suggested by JP '607. Accordingly, withdrawal of the foregoing rejection is respectfully requested.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in

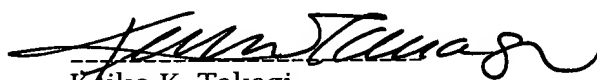
AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 09/579,708

Attorney Docket Q54488

issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Keiko K. Takagi
Registration No. 47,121

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE



23373

PATENT TRADEMARK OFFICE

Date: April 30, 2003

APPENDIX

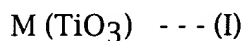
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 18-21 have been canceled.

The claims have been amended as follows.

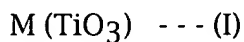
6. (four times amended) [A] The perovskite titanium-containing composite oxide particle [represented by general formula (I),



wherein M is at least one of Ca, Sr, Ba, Pb, or Mg, and

wherein the specific surface area is 28 to about 200 m²/g,] as claimed in claim 1, wherein the particle is obtained by removing a dispersion medium from a sol in which the perovskite titanium-containing composite oxide particle is dispersed, wherein said sol is obtained by a process comprising the step of reacting a titanium oxide particle comprising brookite crystalline form with a metal salt comprising at least one of Ca, Sr, Ba, Pb, or Mg in a liquid phase.

17. (three times amended) [A] The perovskite titanium-containing composite oxide particle [represented by general formula (I),



wherein M is at least one of Ca, Sr, Ba, Pb, or Mg, and

wherein the specific surface area is 28 to about 200 m²/g,] as claimed in claim 1, wherein the particle is obtained by removing a dispersion medium from a sol in which the perovskite titanium-containing composite oxide particle is dispersed,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 09/579,708

Attorney Docket Q54488

wherein said sol is obtained by a process comprising the step of reacting a titanium oxide sol prepared by subjecting a titanium salt to hydrolysis in an acid solution with a metal salt comprising at least one of Ca, Sr, Ba, Pb, or Mg in a liquid phase.